

Idling Reduction Opportunities



Strategic Planning Meeting

Washington, DC

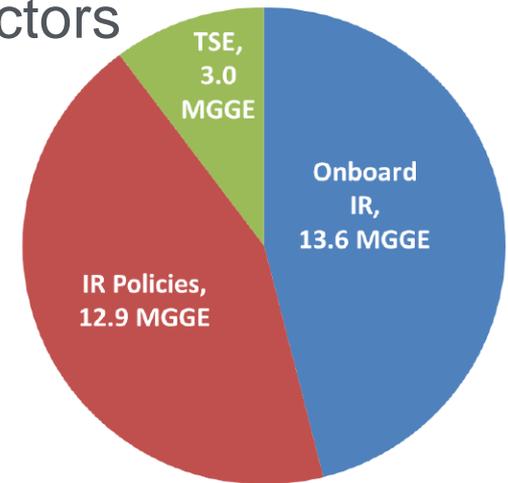
February 25, 2015

Linda Gaines and
Patricia Weikersheimer
Argonne National Laboratory

Idling road vehicles burn 6 billion gallons of fuel annually, getting 0 MPG!



- All vehicles—from cars to locomotives to cruise ships—idle
- Regulations limit idling in many states, counties, and municipalities
- Some idling is not necessary: Just turn it off!
- Some idling provides needed services: Perform the functions more efficiently using technology
- Idling reduction is a win-win proposition
- Outreach and education are needed for all sectors



Clean Cities IR Petroleum Reductions (2013)

Clean Cities' IdleBox provides:

- Idling reduction cost savings calculator
- Presentation on idling reduction (IR) for fleets
- Presentation on IR for everyday drivers
- Presentation module on technology solutions
- Fact sheets, signage, and poster templates
- Pledge forms and policy templates
- Press release templates
- IdleBase, a database of idling regulations
- *National Idling Reduction Network News*
- Stickers



<http://www1.eere.energy.gov/cleancities/toolbox/idlebox.html>

Good-fit niches provide examples



- Multiple options are available
- Optimal solutions depend on services needed, idling duration, routes, location, and regulations
- Technologies are evolving
- Clean Cities' tools can help inform potential users
 - IdleBox
 - AFDC site
 - Argonne web page

Vehicle Type	Suggested Approach or Technology	Petroleum Saving Potential (M GGE/y)
Personal vehicles	Turn the engine off	3000
School buses	Fuel-fired heater	150
Bucket truck	Workplace hybrid	76
Police car	Battery APU	574
Ambulance	Electrified parking space	152
Long-haul truck (North)	Diesel APU	495
Long-haul truck (South)	Electrified parking space	900

Personal vehicles don't need to idle

- Engine warms up faster by driving
 - Idling wastes fuel
 - Idling emissions are especially harmful to children
 - No equipment is needed: just turn the key for immediate savings
-
- ❖ **Barriers: Myths, cold feet, small individual savings**
 - ❖ **Opportunity to save up to 3 billion gallons/year in the US!**



- ❖ **Utah's campaign featured children, Yellowstone-Teton's, a bison.**

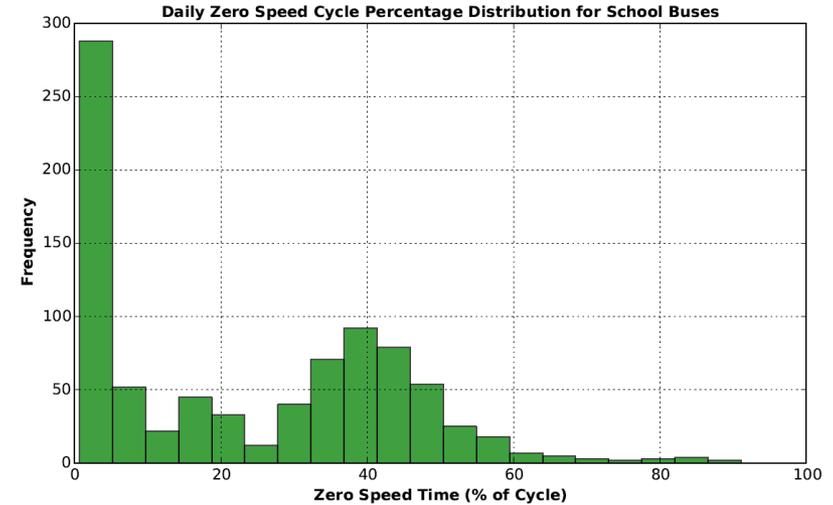


- Articles appeared in Washington Post, Scientific American
- Picked up by local media
- Reader comments showed very mixed reactions
 - Sensible approval
 - Concern for visibility
 - Demand for comfort
 - Incorrect arguments about part wear

Clean Cities' message: Minimize idling your car to warm it up. Most manufacturers recommend driving off gently after about 30 seconds. The engine will warm up faster being driven, which will allow the heat to turn on sooner, decrease your fuel costs, and reduce emissions.

School buses require intermittent heat

- School buses idle 2-3 hours a day
- Heaters can be programmed to preheat the buses
- No-idle policy for buses provides a good example for parents
- Additional outreach materials are available from Clean School Bus USA (EPA)



of Vehicles Reporting: 204

Generated: Thu Aug 07, 2014

of Days Included: 857

- ❖ Barriers: slow payback, grant funding directed to vehicle replacements
- ❖ Opportunity to protect children's health



Graph from NREL Fleet DNA project; schematic courtesy of Espar

- Alt-fuel vehicles don't use petroleum, but reduced idling would reduce operational costs, making alt fuels more attractive
- No data available on alt-fuel idling use, emissions
- Some alt-fuel IR equipment is available for buses and trucks
- ❖ **Barriers: Small initial market raises unit costs and makes installation service costly; perception that alt-fuel idling isn't wasteful**
- ❖ **Opportunity: Build idling reduction into new vehicle designs**



Airtronic NG heater, courtesy of Espar

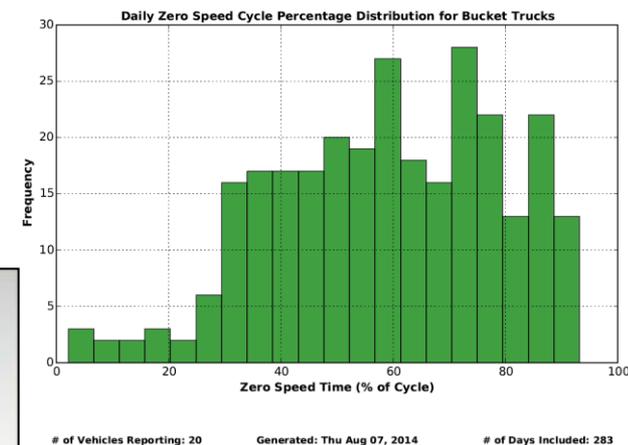
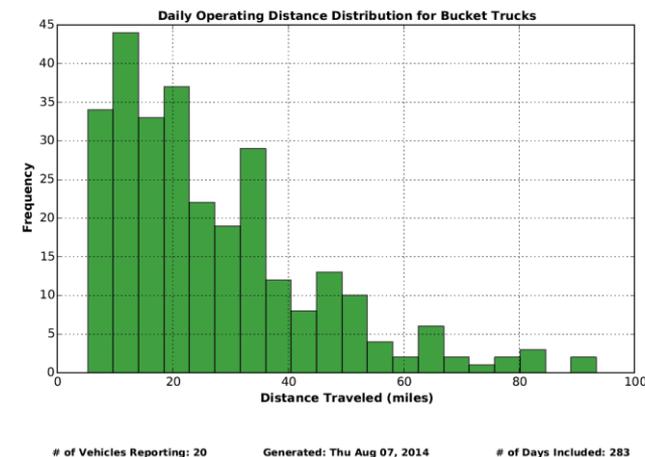
Bucket trucks drive a short distance and stay at the worksite

- Power needed for boom operation and HVAC
- Generally supplied by main engine
- Auxiliary power unit (APU) can provide HVAC
- Battery system can power boom
- New plug-in hybrid systems do both
- Turning engine off reduces impacts

❖ **Barriers: Cost and availability**

❖ **DOE-funded ARRA and Energy Storage projects will reduce costs**

❖ **Opportunity for other trucks with PTO**



Graphs from NREL Fleet DNA Project

Some police cars idle 60% of the time



- 21% of fuel used at idle
- Almost always exempt from idling regulations
- Power needed for
 - Lights, computers, radios, video cameras
 - HVAC
- Auxiliary equipment is available
 - Heat recovery
 - Automatic engine controls
 - Auxiliary battery power
 - Battery APU
- ❖ **Barriers: Initial cost, space requirement, performance**
- ❖ **Clean Cities deployed in Yellowstone-Teton**
- ❖ **Opportunity for other exempt vehicles like armored cars and military vehicles**

Ambulances idle for long periods

- Need power for HVAC, medical equipment, and refrigeration of drugs
- Almost always exempt from idling regulations
- Wastes fuel and pollutes air intake to emergency rooms
- Alternatives available
 - Electrified parking spaces
 - Auxiliary power units

❖ **Barrier: Initial cost**

❖ **South Shore Clean Cities manages BPCADER funding of 16 MediDocks at hospitals**

❖ **Opportunity: food trucks**



MediDock window unit



- FMCSA mandates daily 10-hour rest periods
 - And a 34-hour rest period once per week
- Sleeper cab supplies comforts of home
- Idling a 450-hp engine is inefficient way to keep driver comfortable
- Extended idling illegal in many locations
- Several devices can reduce idling
- Most appropriate system depends on stationary power needs, travel routes, and duty cycles



- **Northern operation** requires heat, power, and some air conditioning.
- EPS supplies all, but is available in limited locations
- Battery APU would require recharging by engine during 34-hour rest, unless plug-in location found (barrier)
- **Diesel APU** can supply power during 34-hour restart
- ❖ **Barriers: Initial device cost; high maintenance requirements**
- ❖ **Opportunities: Develop high-efficiency air conditioner; apply technologies to utility and delivery vehicles**

Long-haul operation in South requires high-performance air conditioning

- Diesel APU may not have good enough air conditioning for hot nights (barrier for use in south)
 - Better air-conditioning systems may change this
- **EPS** (single-system) provides sufficient air conditioning
- ❖ **Barriers: low availability; driver may not get reimbursed for hourly cost; equipment owner needs high occupancy to get ROI**

AFDC hosts TSE locator



- ❖ DOE supported STEP program with ARRA funds; early installations received grants
- ❖ Opportunity to expand to high utilization sites

- Provide information to new sectors
 - Workshops, webinars, and conference presentations
 - Technology showcases
 - Networking opportunities
- Obtain real-world performance and requirement information from stakeholders
- Provide data to labs for analysis
 - Case studies
 - Identify and resolve real-world deployment issues
 - Feedback loop results in improved outreach tools
- Help develop loan programs
 - Loans can be paid back with fuel savings and the \$ reused

Thanks for listening!



- Linda Gaines lgaines@anl.gov
- Patricia Weikersheimer
pweikersheimer@anl.gov

**STOP Idling.
START Saving.**

IDLING IS EXPENSIVE >>>
up to a gallon of fuel per hour in most vehicles

IDLING POLLUTES >>>
a gallon of fuel creates about 20 lbs. of greenhouse gases

IDLING THREATENS HEALTH >>>
breathing vehicle emissions increases risk of respiratory illness

Idling uses more fuel than restarting your engine

•

Idling wastes **6 BILLION GALLONS OF FUEL** each year in the U.S.

The Clean Cities logo is located in the bottom right corner of the poster, featuring the stylized 'C' and the text 'Clean Cities' and 'U.S. Department of Energy'.